

**Silicon NPN Power Transistors**

**2SD1213**

**DESCRIPTION**

- With TO-3PN package
- Low collector-to-emitter saturation voltage  
:  $V_{CE(sat)} = 0.4V(\text{max.})$
- Large current capacity.
- Complement to type 2SB904

**APPLICATIONS**

- Large current switching of relay drivers, high-speed inverters, converters.

**PINNING**

PIN	DESCRIPTION
1	Base
2	Collector;connected to mounting base
3	Emitter

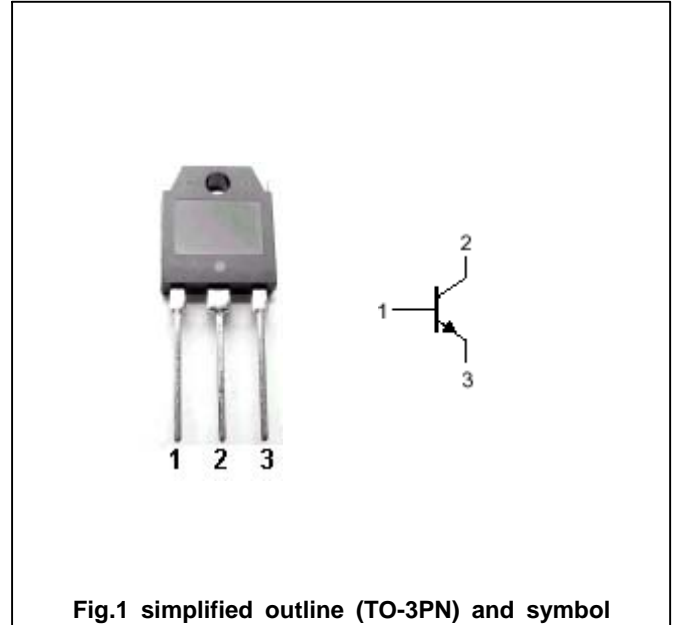


Fig.1 simplified outline (TO-3PN) and symbol

**Absolute maximum ratings (Ta=25 )**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$V_{CBO}$	Collector-base voltage	Open emitter	60	V
$V_{CEO}$	Collector-emitter voltage	Open base	30	V
$V_{EBO}$	Emitter-base voltage	Open collector	6	V
$I_C$	Collector current (DC)		20	A
$I_{CP}$	Collector current (Pulse)		30	A
$P_C$	Collector power dissipation	$T_C=25$	60	W
		$T_a=25$	2.5	
$T_j$	Junction temperature		150	
$T_{stg}$	Storage temperature		-55~150	

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## CHARACTERISTICS

T<sub>j</sub>=25 unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
V <sub>CEO</sub>	Collector-emitter breakdown voltage	I <sub>C</sub> =1mA ; R <sub>BE</sub> =	30			V
V <sub>CBO</sub>	Collector-base breakdown voltage	I <sub>C</sub> =1mA; I <sub>E</sub> =0	60			V
V <sub>EBO</sub>	Emitter-base breakdown voltage	I <sub>E</sub> =1mA; I <sub>C</sub> =0	6			V
V <sub>CEsat</sub>	Collector-emitter saturation voltage	I <sub>C</sub> =8A; I <sub>B</sub> =0.4A			0.4	V
I <sub>CBO</sub>	Collector cut-off current	V <sub>CB</sub> =40V; I <sub>E</sub> =0			0.1	mA
I <sub>EBO</sub>	Emitter cut-off current	V <sub>EB</sub> =4V; I <sub>C</sub> =0			0.1	mA
h <sub>FE-1</sub>	DC current gain	I <sub>C</sub> =1A ; V <sub>CE</sub> =2V	70		280	
h <sub>FE-2</sub>	DC current gain	I <sub>C</sub> =10A ; V <sub>CE</sub> =2V	30			
f <sub>T</sub>	Transition frequency	I <sub>C</sub> =1A ; V <sub>CE</sub> =5V		120		MHz

## Switching times

t <sub>on</sub>	Turn-on time	I <sub>C</sub> =10A I <sub>B1</sub> =-I <sub>B2</sub> =-0.5A		0.3		μs
t <sub>s</sub>	Storage time			0.6		μs
t <sub>f</sub>	Fall time			0.02		μs

◆ h<sub>FE-1</sub> Classifications

Q	R	S
70-140	100-200	140-280

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PACKAGE OUTLINE

